Symbolic, Numerical and Automatic Differentiation

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Three different methods are introduced for taking the gradient of multivariate scaler functions. The implementation in Julia is provided.

Introduction

Symbolic Differentiation

In this technique, the function f has a symbolic representation for which we know how to differentiate analytically using standard derivative rules (product rule, chain rule, . . .).

Finite Difference Methods

Automatic Differentiation

Forward Mode

Backward Mode